

## Quizlet and Podcasts: Effects on Vocabulary Acquisition

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## **Abstract**

To date, several studies have investigated the potential benefits of using Quizlet and podcasts for vocabulary development. However, they have mainly focused on the use of available material, and its effects on receptive vocabulary acquisition and students' motivation. In contrast, relatively little has been done to study the effects of student-generated podcasts and Quizlet flashcards sets on second language vocabulary acquisition including productive skills. Hence, the present study seeks to analyze and compare how student-created podcasts and Quizlet flashcards affect vocabulary retention, taking into account both receptive and productive vocabulary knowledge. Twenty-three adults, aged 18 - 61, participated in the study. The instruments used were vocabulary tests as pre-tests to check students' prior knowledge, and as immediate post-tests to measure receptive and productive vocabulary acquisition, and a questionnaire to gauge students' perceptions of the two methods. Results showed that although there was no significant difference between the two methods regarding receptive or productive vocabulary acquisition, and both techniques helped students to retain new vocabulary, participants expressed a greater preference for the Quizlet methodology.

**Keywords:** vocabulary acquisition, Quizlet, Podcast, receptive vocabulary, productive vocabulary

## **1. Introduction**

The spread and availability of technological tools has considerably transformed education, changing the teaching and learning processes including the way we acquire and practice new vocabulary. A large and growing body of literature has investigated the effects of Computer Assisted Language Learning (CALL) on vocabulary acquisition (Nakata, 2011; Son, 2001). Studies have reported that computer assisted techniques have a positive effect on learning new words (Chien, 2015; Kiliçkaya & Krajka, 2010; Nikoopour & Kazemi, 2014; Stroud, 2014; Wong & Looi, 2010), enhance students' motivation (Chien, 2015; Stroud, 2014), and promote independent, autonomous learning (Anjaniputra & Salsabila, 2018; Farangi, Nejadghanbar, Askary, & Ghorbani, 2015; Phillips, 2017).

However, these studies have mainly used available or teacher-created material. Relatively little has been done to investigate the benefits of student-produced material, even though research has demonstrated that students' participation in the creation of their own learning material is beneficial for their learning (Farangi et al., 2015; Gholami & Mohammadi, 2015; Hsu, Wand, & Komack, 2008; Nikolova, 2002; Wong & Looi, 2010), as students will pay more attention to language, and processing "new lexical information more elaborately will lead to higher retention" (Hulstijn, 2001, p. 270).

The present study seeks to explore and compare the effect of two easily accessible, widely researched, and used online tools - Quizlet and podcasts - on learners' receptive and productive vocabulary acquisition when the digital flashcards and the podcasts are themselves created by students. Both tools have been researched independently and have been shown to be useful for independent vocabulary learning. However, to the best of our knowledge, their efficacy has not been compared in terms of receptive and productive vocabulary acquisition. Thus, the motivation behind this research is to contribute to the continuing quest for effective vocabulary learning techniques that can be used for classroom as well as for individual practice outside class in ~~this~~ the current era of digital development.

This paper first gives a brief overview of former studies discussing the receptive and productive stages of vocabulary acquisition, and looks at previous research investigating the effects of using Quizlet flashcards sets and podcasting on acquiring new vocabulary. Following the literature review, our three research questions are formulated and the methodology used to collect and analyze the data is described in detail. Then, findings are presented and discussed, and conclusions are drawn. Finally, some recommendations are made for the pedagogical application of the findings and further research is suggested.

## **2. Literature review**

### **2.1. Learning vocabulary**

To date, a large number of studies have demonstrated the importance of vocabulary in second language acquisition. Schmitt (2000) pointed out that "lexical knowledge is central to communicative competence and to the acquisition of a second language" (p. 55), while Richards (2000, in Schmitt, 2000) affirmed that "vocabulary and lexical units are at the core of learning and communication. No amount of grammatical or other type of linguistic knowledge can be employed in communication

or discourse without the mediation of vocabulary” (p. xi). Vocabulary knowledge is, thus, indispensable in mastering the four language skills and developing students’ overall English knowledge, since without sufficient vocabulary, second language learners would not be able to do language development activities, such as grammar, reading and writing tasks (Groot, 2000).

Research has shown that second language proficiency largely depends on the range of vocabulary a learner has acquired, and that limited vocabulary knowledge can impede successful communication (Alqahtani, 2015; Anjaniputra & Salsabila, 2018). According to Groot (2000), there is consensus among linguists that a minimum vocabulary base is needed for functional language proficiency. Laufer (1997) and Nation (1990), for example, set the minimal requirement at 5000 words.

Vocabulary knowledge can be divided into receptive and productive skills. The first one refers to the ability to recall and recognise a word in reading and listening, while the latter alludes to the ability to use it in speaking and writing (Nation, 2001). Laufer (1998) used the terms “active” and “passive” vocabulary knowledge for the same concepts, and distinguished a third category that represents the transition between passive/receptive and active/productive knowledge. She called it “controlled active” or “controlled productive” knowledge, which entails the ability to use the word occasionally, especially “when prompted by a task”, whereas learners with “free productive knowledge” are able to use the word at their “free will”, without the need for “any specific prompts” (p. 257).

Second-language (L2) learners tend to have higher receptive skills, whereas they generally need more time and effort to improve their productive skills and knowledge. Research (Laufer, 1998; Webb, 2007) has suggested that repetition plays a key role in vocabulary acquisition. The results in Webb’s (2007) study showed that increased repetition of a lexical item led to greater gains in knowledge about that word. He indicated that more than ten repetitions might be needed to develop full knowledge of a word. As Laufer (1998) claims, there is often a lack of correlation between the size of passive and active vocabulary. At lower stages of language learning, the size of both kinds of vocabulary is usually not very different because passive/receptive vocabulary is usually small, and the repeated use of those words, which are difficult to avoid when speaking, facilitates their transition from passive to active knowledge. However, when passive vocabulary is enriched with less frequent lexis, the gap between receptive and productive knowledge widens, since meaning can be conveyed without using the less

common vocabulary, and, thus, those words are hardly used productively. In fact, according to Laufer (1998), if learners are not encouraged or “pushed” to use less common lexis, it may never become part of their productive knowledge (p. 267). This idea seems to support Swain’s (1995) output theory, which claims that language production favours second language acquisition in different ways. When learners are encouraged to produce output, they are given an active and responsible role to play in the learning process. Producing output requires a higher cognitive effort than receiving input and enables learners “to process language more deeply” (p. 128). In the same vein, Hulstijn (2001) showed that one of the key aspects of successful vocabulary acquisition is “the quality and frequency of the information processing activities” (p. 274). Unfortunately, in a language class, the limited time and large group sizes do not allow for extensive practice on productive language skills or time-consuming elaboration of information processing activities, hence, it is important to explore different techniques that provide learners with opportunities for self-practice. The two techniques investigated in this paper, Quizlet and podcasting, have been proven effective in fostering independent, autonomous learning (Anjaniputra & Salsabila, 2018; Philips, 2017; Rosell-Aguilar, 2007). However, only a few studies have looked at whether they are useful for enhancing both receptive and productive vocabulary knowledge.

## **2.2. Use of Quizlet flashcards and podcasts to learn vocabulary**

Quizlet is a flashcard program that allows learners to study vocabulary in a pair-associate format (Nakata, 2011). Studies have demonstrated the effectiveness of paired-associate learning tasks, showing that a large number of words can be memorised in a very short time (Fitzpatrick, Al-Qarni & Meara 2008; Nation, 1980; Thorndike, 1908). Quizlet enables students to create their own digital flashcards and offers six different learning modes for students to practice and study. Research has demonstrated that it contributes to widening students’ receptive vocabulary knowledge (Milliner, 2013). Furthermore, students can produce the term in written or spoken form, which might enhance their controlled productive knowledge.

When creating a podcast, learners produce and contextualise words, acquiring procedural knowledge by practicing the use of the L2 word in a communicative context. As Oxford and Crookall (1990) suggest, production practice allows learners to broaden their vocabulary in different ways. Speaking and writing help learners to access existing schemata they created when they learnt the meaning of the new word, and enable them

to put it into practice. However, they stress that production practice solely is not enough to acquire new vocabulary, since the new word has to exist in the learner's memory, that is, in their receptive vocabulary, before it can be used in production. The use of flashcards can help to create the schemata in the learner's memory. However, according to Oxford and Crookall (1990), it has a rather limited value in vocabulary acquisition due to their decontextualised nature. Nevertheless, if the flashcards are created by students, the words can be used in a meaningful context; images and visual support can be added, and the act of creating itself might benefit learners (Oxford & Crookall, 1990).

Although both Quizlet and podcasting are computer-based tools, they differ because Quizlet combines visual elements with audio, while podcasting includes only-audio material. Nevertheless, if we only focus on the process of creating a flashcard set or a podcast, on a cognitive scale, the former requires less mental effort. Making flashcards means copying or reproducing terms and definitions, which need lower cognitive skills than creating content by using new words in a meaningful context.

Various researches have investigated the effect of visual elements on vocabulary acquisition and found that the use of imagery can contribute to better learning by ensuring a more profound mental processing through meaningful association (Mohseni-Far, 2008; Papagno & Vallar, 1992; Schmitt, 2000). Son (2001) compared two types of lexical annotations, verbal only and verbal with visual information, and concluded that annotations with visual elements proved more beneficial for vocabulary acquisition than only verbal annotations. Hashemi and Pourgharib (2013) also studied how to enhance students' lexical knowledge by using visual materials such as flashcards, pictures and realia. Participants in their study were divided into experimental and control group and studied the new words with the aid of visual elements in the former, while using translation in the latter. According to the findings, students in the experimental group had significantly higher scores in the post-test and were able to retain and recall those words more easily.

A large and growing body of literature has demonstrated the benefits of using digital flashcards to enhance students' vocabulary acquisition. However, research on the subject has been mostly restricted to describing learners' perception, engagement and motivation using qualitative methods. Studies have established that the use of Quizlet fosters students' autonomy and persistence, and turns learning vocabulary into an enjoyable experience (Anjaniputra & Salsabila, 2018), while it also increases students'

overall engagement compared to more traditional methods, such as textbooks (Stroud, 2014). Chien (2015) pointed out that students find online vocabulary websites, especially Quizlet, motivating and a helpful tool for vocabulary acquisition. Participants in his study also felt that by using Quizlet, their vocabulary knowledge improved. Korkealehto and Sinklander (2018), who based their findings on students' diary entries and responses to a questionnaire, also reported that students believed Quizlet enhanced their written and oral language skills.

Nonetheless, a relatively low amount of research has measured the effectiveness of Quizlet in vocabulary acquisition with quantitative methods, and the focus has primarily been on receptive vocabulary knowledge, even though both active and passive vocabulary can be practised depending on the learning mode used by the students. Some learning modes only require students to recognize the word while in others students are instructed to spell or write the vocabulary items. Dreyer (2014) examined how the use of Quizlet affected students' vocabulary test scores in an urban high school language arts class, and demonstrated that students using Quizlet steadily outperformed students in the Non-Quizlet group on weekly vocabulary tests. Likewise, the results of pre- and post-tests in Dizon's (2016) study, which was carried out with Japanese students who used Quizlet over the course of 10 weeks, revealed that "learners were able to make statistically significant gains" (p. 40), and perceived Quizlet as a useful tool for vocabulary acquisition. These results are in congruence with other studies showing that the use of the Quizlet application in Mobile Assisted Language Learning has a similarly positive impact in improving students' vocabulary acquisition while fostering students' autonomy and motivation (Ali & Kassel, 2018). Apart from enhancing language proficiency (Shadiev, Hwang & Huang, 2017) and fostering language learning outside the classroom (Demouy, Jones, Kan, Kukulska-Hulme & Eardley, 2016), using such application on mobile devices also provides students the opportunity to create a collaborative and learner-centered environment (Burston, 2014) and to learn anywhere, anytime, which, in Dashtestani's (2015) study, students considered highly beneficial for second language acquisition.

Similarly, the vast majority of research on using podcasts for vocabulary acquisition has found that they increased students' motivation and helped create a positive attitude towards learning (Farshi & Mohammadi, 2013; Gholami & Mohammadi, 2015; Hasan & Hoon, 2013; Mashhadi, Hayati & Jalilifar, 2016). However, according to some studies, the technological nature of podcasting might be an

obstacle for language learners and instructors (Menzies, 2005; Phillips, 2017). Philips (2017) claimed that the novelty associated with using this technology might evoke feelings of apprehension and anxiety in students who had never used podcast before and were unfamiliar with new technologies. Some participants in her study found producing podcast time-consuming and expressed their dislike for the sound of their recorded voices. Hence, she suggested that students should be guided throughout the whole process and should be able to discuss their doubts with the investigator. This way they might be able to gain confidence with new technologies, and students who feel insecure about speaking English in class and participate in real-time interaction might benefit from working at their own pace.

A number of studies have also demonstrated podcasts' effectiveness in learning new vocabulary. Mashhadi et al. (2016) found that integrating podcasts into vocabulary teaching and learning produced better results than more conventional methods. Kargozari and Zarinkamar (2014) came to a similar conclusion after measuring the lexical development of 32 EFL learners who had studied new lexical items through podcasts, or in the traditional way. The investigators found that students in the experimental group, who had been exposed to podcasts containing some highlighted words, outperformed the students in the control group, who had been taught the same words in a traditional way, in the post-test.

However, most of the research investigating the impact of Quizlet and podcasting on students' vocabulary acquisition has used investigator-created or available material. Relatively little has been done to study the benefits of student-created podcasts and Quizlet flashcards, despite the fact that various studies have demonstrated the cognitive, affective and motivational benefits accrued to students' creating their own learning material (Gholami & Mohammadi, 2015; Hsu et al., 2008; Milliner, 2013; Nikolova, 2002; Oberg, 2012; Philips, 2017; Wong & Looi, 2010). For example, Nikolova (2002) investigated how effective vocabulary acquisition is when students participate in the creation of the learning material. Learners in her research were told to study a French text downloaded from the Internet on a computer. Students in the control group had visual, audio and textual annotations for 20 low-frequency words, while students in the experimental group were asked to create the annotations for the same words. She found that the students in the experimental group learnt the words significantly better than the students in the control group. This suggests that students'



participation in producing their own learning material positively affects vocabulary acquisition.

Similar findings were presented in the scarce research carried out on the impact of student-created podcasts on vocabulary acquisition. Gholami and Mohammadi (2015) studied how three levels of podcast integration (high, low and no integration) affected 90 Iranian intermediate learners' lexical knowledge. In the high integration group, students were instructed to listen to online podcasts as well as to record their own audio file using the new vocabulary items from the podcasts. Then, they also had to listen to other learners' recordings and comment on them. On the other hand, students in the low integration group were only required to listen to the podcasts, and did not have to do the recording task or comment on the audio files. Finally, in the no integration group, the podcast files were used as conventional listening comprehension exercises. According to their findings, students in the high integration group significantly outperformed students with no or low podcast integration in their syllabus, and they also demonstrated positive attitudes towards using podcast as a pedagogical tool.

Philips (2017) highlighted the importance of doing research on student-generated podcasts, as producing audio files requires higher cognitive effort than simply consuming them, and thus, may lead to greater awareness of some fundamental aspects of the target language, as well as to a more independent and autonomous learning. However, her study only explored students' attitudes and perceptions by means of two surveys and did not measure the impact of recording those podcasts on students' speaking skills or vocabulary acquisition.

In conclusion, a great number of studies have demonstrated the benefits of available Quizlet flashcards and podcasts on learner's vocabulary acquisition, while research is scarce on the effects of student-created material. As Quizlet and podcasting are easily accessible for both students and teachers, they have been widely used in SLA teaching for different purposes including teaching and practicing new vocabulary. Nevertheless, research investigating their effectiveness has mainly looked at how they enhance receptive vocabulary knowledge and students' motivation. To the best of our knowledge, no study has been conducted to compare the effectiveness of student-created Quizlet study sets and podcasts in vocabulary development taking into account the role they play in receptive and productive vocabulary acquisition.

### **3. Research Questions**

On the basis of the theoretical background discussed above, the present study seeks to answer the following questions:

- 1) Which technique helps students to acquire more new vocabulary: creating a podcast or a Quizlet flashcards set?
- 2) Are there any differences between the two techniques in terms of receptive and productive vocabulary acquisition?
- 3) Which of these methods do learners prefer for the acquisition of new vocabulary?

## **4. Methodology**

### **4.1 Design and participants**

This study was a quasi-experimental pre-test post-test with switching replication design. This design was selected because the number of students available was low and to counteract the possible confounding effects of the difficulty of the words in each of the two vocabulary sets. Therefore, both groups underwent both treatments.

The participants were adult students enrolled on a face-to-face C1 course (a level defined as advanced by the Common European Framework of Reference for Languages, Council of Europe, 2001) at an Official Language School (EOI). These schools are state institutions funded and organized by Spanish regional education authorities. One of their most characteristic features is their orientation towards adult education, as the prerequisite to enter is to be 16 years old or older, have completed the first of the two cycles of secondary education in Spain or the equivalent abroad. Consequently, most classes are made up by heterogeneous groups regarding age, cultural level or socioeconomic class.

All the students participating in this research (7 male and 16 female) had passed a B2 level proficiency test to enroll in the course, and their ages ranged between 18 and 61 ( $M = 40$ ), as it is common in that context. Their first language was Spanish, and they were middle-class students with university studies who had previously studied English at high school. They gave their oral consent to participate in the study.

The research was carried out over the course of three weeks in two different intact classes (henceforth referred to as Group 1 and Group 2) of 25 students. However, as the end of the academic year was quite near, many students were not coming to class,

therefore, the real number of students in a lesson oscillated from ten to twenty. Out of these students, 12 in total (seven in Group 1 and five in Group 2) completed the pre-test and post-test and underwent the treatment in the first round, and 11 students (six in Group 1 and five in Group 2) in the second round.

## **4.2 Instruments**

Five instruments were used to collect the data. The first two instruments were two pre-tests (pre-test 1 and pre-test 2), which were designed to check students' prior knowledge regarding two different sets of vocabulary and contained 14 words (see Appendix 1). The vocabulary items in pre-test 1 were related to the topic of work and employment, the first set of vocabulary, whereas in pre-test 2, the second set, the words were related to the field of science and technology. In both pre-tests, students were asked to define the words in either English or Spanish, or to provide a translation. The authors of this research chose C1-level words from different C1-level course books, and aided by the teacher of the students, who was an experienced C1-level instructor. It was considered that students were not likely to be familiar with those words, but they could later use them in class-work for the different tasks and discussions designed for the units the students were doing as part of their curriculum.

After the treatment, two post-tests (see Appendix 1), one for each set of words, were given to the students to check vocabulary acquisition. Post-test 1 was designed to check the acquisition of the words related to work and employment, while post-test 2 was created to find out how many of the words related to science and technology students had acquired. Each post-test was divided into two parts. In the first part, designed to test receptive vocabulary knowledge, students had to match the 14 words with their definitions from 14 definitions provided. No distractors were included. In the second part, which served to assess productive vocabulary acquisition, students were given three thought-provoking quotes related to the topic and were instructed to write an opinion essay of around 200 words using the words. This kind of post-test was chosen because the interaction part of the final oral exam in the School of Languages contains three quotes the students have to talk about. Consequently, similar quotes were used to increase the ecological validity of the post-tests so that students could have the impression that by doing them they were also practising for the exam.

Once the post-tests were done, students answered a questionnaire. The questionnaire was designed based on our review of previous research on the topic, and it aimed to obtain some biodata as indicated by previous authors (Philips, 2017). It contained both Likert-scale and open questions and it was anonymous to encourage students to express their opinions freely. Nevertheless, some background information such as their age, the hours they spent online daily, the type of social networking accounts they had, the internet resources they used to learn English, their way of learning new vocabulary and how confident they felt about using new technologies was collected. The Likert-scale questions were created to find out their opinion about using Quizlet flashcards and podcasting for vocabulary acquisition, and how much they thought these methods helped them to learn new words. It contained eight statements about both Quizlet and podcasting, and participants were asked to rate how strongly they agreed with each statement on a 4-point scale ranging from strongly agree (4) to strongly disagree (1). The scale did not provide a 'neutral' option, such as 'neither agree nor disagree' or 'not sure', since, according to the relevant literature, the middle value can reduce the number of evaluative reactions (Dörnyei, 2010; Mizumoto, Chujo & Yokota, 2016).

Two additional statements were also included to gauge students' attitudes towards new technologies. In the first one, students had to mark on a 5-point scale how confident they felt about using new technologies, while the other one was designed on a 4-point scale to find out how interested students were in learning with new technologies. Four open questions gave students the opportunity to express their thoughts and feelings about using the two methods and articulate their preferences more clearly. In the first open question, participants were asked which method they preferred for vocabulary acquisition justifying their choice. As previous research (Philips, 2017) had pointed out participants seemed to dislike listening to their own voice in a recording, and this could create a negative attitude towards podcasting, one question related to that was included in the questionnaire. As Quizlet and Podomatic websites allow users to share their creations with other people, students were encouraged to do so with both their Quizlet study sets and their podcast audio files, and were asked about whether they had opted for that possibility and their motivation for doing so in the last two questions of the questionnaire.

Cronbach's alpha for the Likert-scale questions related to both Quizlet flashcards and podcasting was .877, which is higher than the recommended threshold of .7 for reliability.

### **4.3 Procedure**

First, both groups were taken to the Resource Room of the school, where each student was given an iPad and was provided with a detailed guidance on how to create an account on both websites and how to use the main features.

After the participants familiarised themselves with both websites, the same pre-test (pre-test 1, related to the topic of work and employment) was administered to both groups in the following session to measure students' prior knowledge. Students had to define the words provided in English or Spanish. Once the pre-test was done, participants were taught the vocabulary through an exercise in which they had to guess the meaning of the words from context in pairs or small groups. After the meanings were elicited and the exact definition for each word was given to them using open-class feedback, Group 1 created a study set on Quizlet including all the words, while Group 2 made a podcast giving their opinion about the three quotes they were given using the vocabulary. These tasks had to be done individually by the students at home. After creating their podcasts and Quizlet flashcards sets, the participants had to send the recordings and the links to the second author's email address and they were also given the option of sharing those links with the rest of the students in the classes. In the next class, a post-test was given to students to measure their receptive vocabulary knowledge with a matching exercise where participants had to match the words with their meanings. In the productive post-test, students were instructed to write a short text concerning three quotes using the new vocabulary. The quotes were carefully chosen so that in their answers students could easily include the new expressions. For example, two of the quotes in the productive post-test dealing with work-related vocabulary referred to employee recognition and how to motivate employees to work at their full potential, which gave room for students to talk about "dead-end jobs", "donkeywork", "perks of the job" etc.

As can be seen in Table 1, the same procedure was repeated a week later with the topic of science and technology. To minimise any possible group or vocabulary set effects, Group 1 produced podcasts and Group 2 created Quizlet study sets. Finally, the

questionnaire including the 18 Likert-scale and the 4 open questions was administered to both groups.

Table 1: Procedure

	Session 1	Session 2	Treatment at home	Session 3	Session 4	Treatment at home	Session 5	Session 6
Group 1	How to use Quizlet and Podomatic	Pre-test 1	Quizlet	Post-test 1	Pre-test 2	Podcast	Post-test 2	Questionnaire
Group 2			Podcast			Quizlet		

#### 4.5 Data analysis

First, the results of the pre- and post-tests of each group as well as the quantitative data obtained from the Likert-scale questions were introduced in an Excel spreadsheet and the means were calculated. Only the results of the students who had done both the Quizlet and the podcast were considered.

Retention rate was examined by analyzing and comparing the results of the pre and the post-tests to determine which method had helped students to retain more vocabulary. After that, recognition and production rates were examined by contrasting the results obtained with the two methods within the same group to see which method benefited more receptive and productive vocabulary acquisition. The results of the tests with the same set of vocabulary were also compared to find out whether the difficulty of the words affected acquisition.

Inferential statistical tests using SPSS were also run to see whether there were any significant differences. Given the small sample and the fact that the data were not normally distributed according to a one-sample Kolmogorov-Smirnov Test of normality, non-parametric tests were used. Mann-Whitney U tests for unrelated samples were run to test the results of both treatments and the two sets of vocabulary between the two groups, and Wilcoxon signed-rank test for two related samples to test the results of the pre and post tests for the same group. Significance level was set at .05.

Finally, students' answers to the questionnaires were analyzed. Means and positive answers were calculated for the Likert-scale questions, and yes and no answers were counted for one of the open questions. Thematic analysis was carried out with the qualitative data from the remaining open questions. The answers to the questions were first read and coded into negative or positive answers. Secondly, common themes

within the positive and negative answers regarding students' attitudes were identified. Then, the data was read a third time looking for the themes which had emerged most frequently. Finally, examples of those themes were selected to illustrate them.

## 5. Results

### 5.1 Results by method

As can be seen in Table 2, Group 1 obtained higher results on both the receptive and the productive post-tests after the Quizlet treatment, achieving 12.86 points in the receptive and 5 points in the productive post-test, as compared to 12.3 points in the receptive and 3.3 points in the productive post-tests following the podcast activity.

Table 2: Results by method.

	Quizlet				Podcast		
	Pre-test	Post-test Receptive	Post-test Productive		Pre-test	Post-test Receptive	Post-test Productive
Group 1 Work and employment	1.14	12.86	5	Group 1 Science & Technology	3.17	12.3	3.3
Group 2 Science & Technology	4.4	13.4	4.2	Group 2 Work and employment	3.6	14	5.4

However, the results of Group 2 (see Table 2) showed the exact opposite. Students did better in the two post-tests after the podcast treatment, achieving the maximum score possible, 14 points, in the receptive and 5.4 points in the productive post-test, while after the Quizlet treatment they obtained 13.4 points in the receptive, and 4.2 points in the productive post-test.

Comparing the receptive post-test results of each group after each treatment (see Table 2), we can see that the difference was minor. Group 1 scored 12.86 in the receptive post-test after the Quizlet treatment and 12.3 after the podcast treatment, a difference of 0.53 points, whereas Group 2 scored 13.4 after the Quizlet treatment and 14 after the Podcast, a difference of - 0.6. The results between the groups did not reach significance before the treatments ( $Z = -1.084$ ,  $p = .278$  before Quizlet, and  $Z = -.278$ ,  $p = .781$  before Podcast), so both groups were comparable before the treatments. After

the Podcast treatment, the results reached statistical significance ( $Z = -2.115$ ,  $p = .034$ ), but not after the Quizlet treatment ( $Z = -.428$ ,  $p = .669$ ).

The productive post-test results were also quite similar, and not statistically significant. As for Group 1, the mean score of the productive post-test scores after the Quizlet treatment was 5 points, only 1.7 points higher than after the podcast treatment (3.3). Group 2 scored 4.2 points after the Quizlet treatment and 5.4 points after the podcast treatment with a difference of 1.2 points. In other words, there was no remarkable difference between the two methods concerning the number of words acquired by the students. Furthermore, no statistically significant difference was found between the productive test results (Quizlet  $Z = -.491$ ,  $p = .624$ ; Podcast  $Z = -1.192$ ,  $p = .233$ ).

Both Quizlet and podcasting proved to be effective methods for receptive vocabulary acquisition, as the gains were considerable for both groups from the pre-test to the receptive post-tests (see Table 3). Group 1 experienced a gain of 11.72 after the Quizlet treatment and a gain of 9.13 after the Podcast treatment. Both gains were statistically significant (Quizlet treatment  $Z = -2.371$ ,  $p = .018$ ; Podcast  $Z = -2.214$ ,  $p = .027$ ). Group 2 increased their scores by 9 points after the Quizlet and by 10.4 after the Podcast, and both differences were statistically significant (Quizlet treatment  $Z = -2.023$ ,  $p = .043$ ; Podcast  $Z = -2.032$ ,  $p = .042$ ).

Gains more were modest regarding productive vocabulary. Group 1 improved 3.86 after the Quizlet treatment and 0.13 after the Podcast, and Group 2 experienced some improvement (1.8) after the Podcast, but worsened after creating the Quizlet flashcards (-0.2). No statistically significant difference was found in productive vocabulary (Group 1 Quizlet  $Z = -1.880$ ,  $p = .06$ ; Podcast  $Z = -.271$ ,  $p = .786$ ; Group 2 Quizlet  $Z = -.406$ ,  $p = .684$ ; Podcast  $Z = -.948$ ,  $p = .343$ ).

Table 3: Gains by method used

	Quizlet receptive	Quizlet productive		Podcast receptive	Podcast productive
Group 1 Work and employment	11.72	3.86	Group 1 Science & Technology	9.13	0.13
Group 2 Science & Technology	9	-0.2	Group 2 Work and employment	10.4	1.8



Taken into consideration gains depending on vocabulary set (see Table 4), both groups achieved higher gains on both the receptive (Group 1=11.72; Group 2= 10.4) and productive (Group 1=3.86; Group 2= 1.8) post-tests of the work and employment vocabulary set than on the receptive (Group 1= 9.13; Group 2=9) and productive (G1=0.13; Group 2= -0.2) post-tests of the science and technology vocabulary set. However, the differences were not statistical significant (Work set  $Z=-1.248$ ,  $p=.212$ ; Science and technology set  $Z=-1.298$ ,  $p=.194$ ). This finding seems to suggest that the vocabulary chosen for the two treatments affected acquisition more than the techniques, as both groups performed better with one of the vocabulary sets regardless of the treatment.

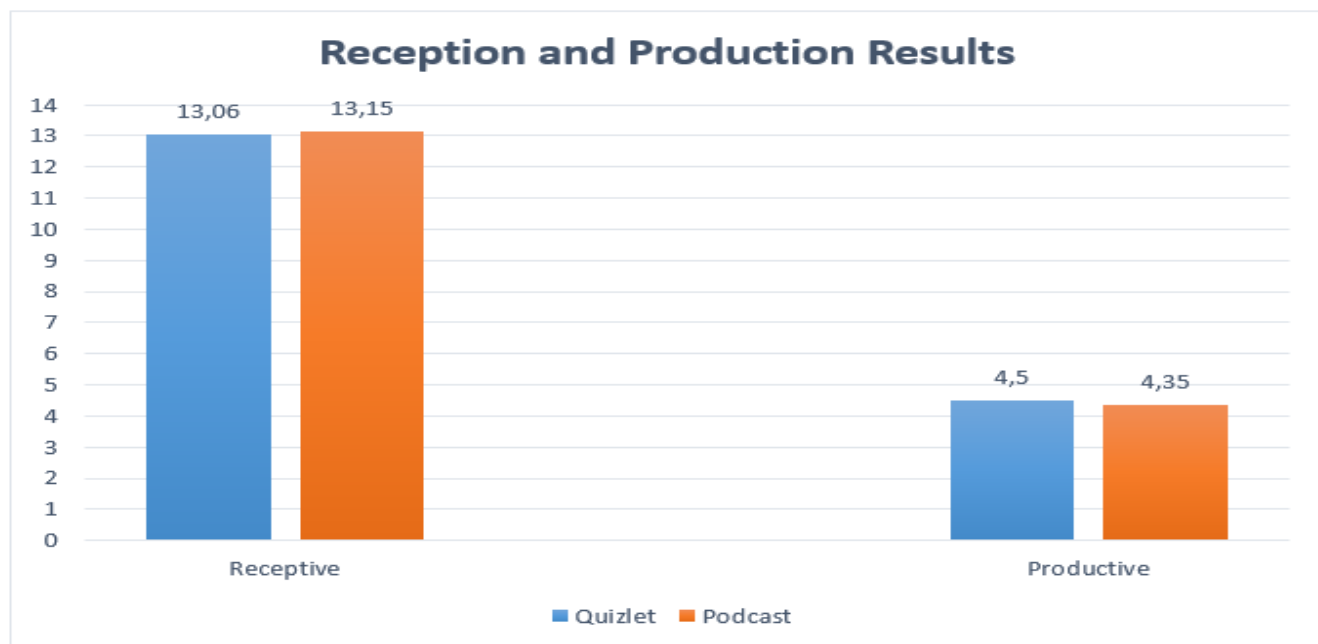
Table 4: Gains by vocabulary set

	Work receptive	Work productive		Science receptive	Science productive
Group 1 Quizlet	11.72	3.86	Group 1 Podcast	9.13	0.13
Group 2 Podcast	10.4	1.8	Group 2 Quizlet	9	-0.2

## 5.2 Reception and production results

As can be seen in Figure 1, both groups obtained higher scores in the receptive post-tests than in the post-tests measuring productive vocabulary knowledge. The mean of the two groups' receptive post-test scores was 13.06 after the Quizlet treatment, and 13.15 after the podcast treatment. These results were considerably higher than the ones obtained in the productive post-tests, which were 4.5 points after the Quizlet and 4.35 points after the podcast treatment.

Figure 1: Reception and production results



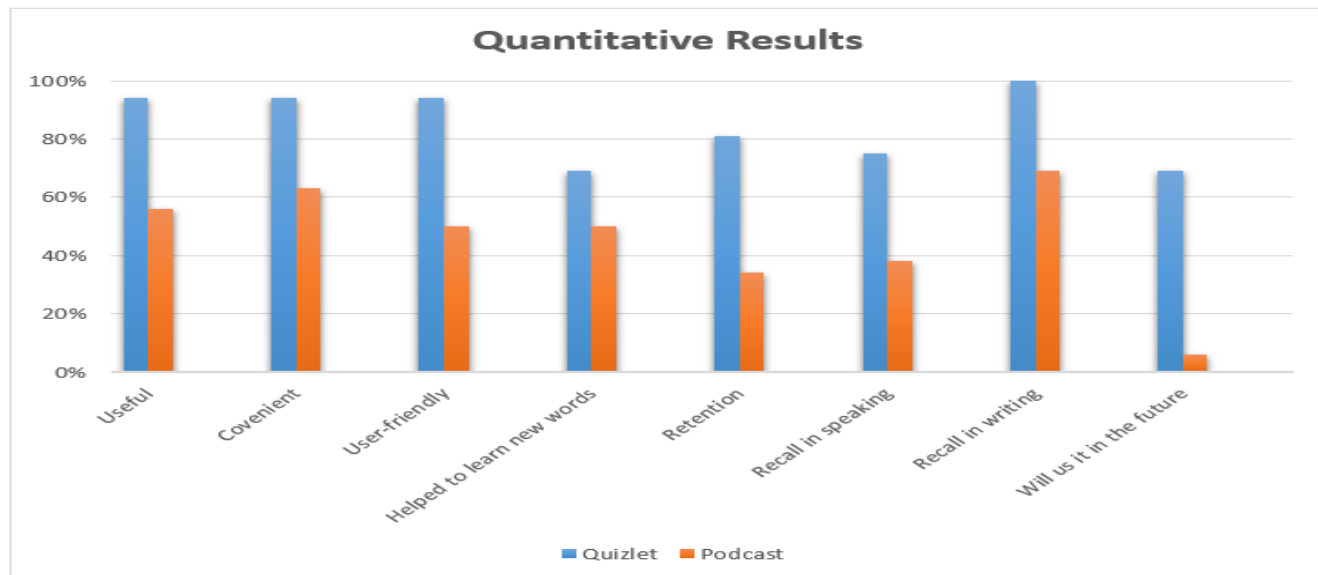
As for the difference between the two methods regarding receptive vocabulary acquisition, it can be observed that the podcast treatment produced slightly higher scores (13.15) than the Quizlet treatment (13.06). However, this difference of 0.09 points between the mean scores is not important. With regard to the productive vocabulary knowledge, the mean score obtained after the Quizlet treatment was 4.5 points, 0.15 points higher than the mean result of the productive post-tests after the podcast treatment (4.35). In conclusion, students, in general, did better in the receptive post-test after the podcast treatment, and achieved higher scores in the productive post-test after the Quizlet treatment. Nevertheless, the difference was quite small and not significant ( $Z=-.912$ ,  $p=.350$  for receptive vocabulary, and  $Z= -.008$ ,  $p= .931$  for productive).

### 5.3 Results of the questionnaire

Out of the 22 students whose results were taken into consideration, 16 completed the questionnaire. The majority of those students, 69%, said they felt confident about using new technologies. All of them had social networking accounts and went online daily. The amount of time they spent online a day varied between 30 minutes and 15 hours. All of them used internet resources for language learning, mainly

TED talks and online dictionaries. Participants mentioned they usually learnt new words by reading, listening to music and watching films or series. Eighty-nine per cent showed interest in learning about new online tools that help language acquisition.

Figure 2: Results of the questionnaire (percentages)



The results of the questionnaire showed that students favoured Quizlet over podcasting (see Figure 2). Nearly 100% of the respondents believed that Quizlet was a useful and convenient tool to acquire new vocabulary and found it user-friendly, whereas only a bit more than half of the students thought the same about podcasting. 69% claimed that using Quizlet had helped them to learn new words, and 81% felt that it had also facilitated retention, while only 50% thought podcasting had helped them to acquire new vocabulary and the number of those who believed they had successfully retained the words learnt by this method was only 34%. Seventy-five per cent reported they were able to recall the words they had learnt with Quizlet and produce them orally, while all the respondents agreed that they could reproduce them in written texts. On the other hand, only 38% had the impression they were able to use the vocabulary learnt through podcasting in oral interaction, and 69% believed they could use them in writing. Finally, 69% expressed their intention to use Quizlet for vocabulary acquisition in the future, while a very low number of students, only 6% would do the same with podcasting.

As for the qualitative data, students' responses to the open questions were quite homogeneous. When asked whether they preferred Quizlet or podcasting, only one of

the respondents choose podcasting, while the rest clearly opted for Quizlet, and one student found both methods very useful. Respondents agreed that Quizlet was much easier and more comfortable to use than podcasting, and they also liked the fact that it was accessible anywhere and anytime through the mobile app. Some participants also commented that it was “more visual” and “interactive”, and the games provided a fun way to memorise the words through repetition. Students also felt that they learnt more easily by reading, “seeing”, and writing the words than by “using their voice”.

In response to the question regarding their feelings about recording themselves, most of those surveyed reported that they felt “strange”, “embarrassed”, and “ridiculous”. However, some students thought it to be a useful technique to practice pronunciation and to become aware of one’s own mistakes. Nevertheless, only one student shared his podcasts with his classmates. Most of them said they “did not want to be exposed in that way”, they felt too “shy” about it, and one participant expressed his/her concern regarding the amount of time it takes to “prepare, record and upload everything.” On the other hand, more participants were willing to share their Quizlet study sets with the others. One third of the students agreed that it was “useful to compare” the flashcard sets and, by sharing them with each other, it would be “easier to get a broader variety of the topics covered”.

Both the quantitative and qualitative data obtained from the questionnaire seemed to reflect participants’ preference for Quizlet over podcasting for vocabulary acquisition, and their impression that with the Quizlet method their learning had been more successful and productive.

## **6. Discussion**

In the following section, the three research questions formulated earlier in this paper will be answered considering the quantitative and qualitative results that have been presented.

As the data obtained during the collection process indicates, there were no significant differences between using Quizlet or podcasting regarding the amount of new vocabulary acquired by the students. In the post-tests measuring receptive vocabulary acquisition, Group 1 had a difference of 0.53 between both methods, while Group 2 showed a difference of 0.6 points. As for productive vocabulary acquisition, Group 1 achieved 1.7 points more after the Quizlet treatment in the productive post-test,

whereas Group 2 obtained 1.2 points more after producing a podcast. These results seem to demonstrate that both methods were effective techniques for vocabulary acquisition since the gains were significant for both groups, especially comparing the receptive post-tests to the pre-test results. These results confirm previous research on both methods, which had reported them as effective for receptive vocabulary acquisition (Dreyer, 2014; Dixon, 2016; Gholami & Mohammadi, 2015)

Regarding the post-test results, Group 2 actually achieved lower scores in the productive post-test after the Quizlet treatment than in the preceding pre-test, whereas in the rest of the cases the gains were quite small. This finding may be explained by Oxford and Crookall's (1990) theory, which argues that to be able to acquire a word productively; students have to go through different stages of acquisition. First, they have to learn the meaning of a given word, thus creating a schemata of that vocabulary item in their memory. Only after that can the word be used in production, and, following repetitive use, it might become part of the learner's productive knowledge. Given the short time participants in this study had between the treatment and the productive post-test, they probably did not have enough occasions to use the new vocabulary in oral or written production. Hence, the transition of these vocabulary items from receptive to productive vocabulary knowledge could not occur.

Regarding the second research question comparing the two techniques in terms of receptive and productive vocabulary knowledge, and although there were important differences between students' receptive and productive vocabulary knowledge from the pre-tests to the post-tests, none of the methods seemed to benefit more either receptive or productive vocabulary acquisition. Both of them produced statistically significant gains but only in receptive vocabulary acquisition. Both methods have been reported to produce large gains in receptive vocabulary knowledge. Our results support Milliner's (2013) findings, which also demonstrated the positive effect of student-created Quizlet study sets on receptive vocabulary knowledge, and confirm the effectiveness of using Quizlet for vocabulary acquisition pointed out by Dreyer (2014) and Dizon (2016). Similarly, major gains on receptive post-tests with the podcast method have already been demonstrated by Gholami and Mohammadi (2015), who found that students who created audio files learnt significantly more words than those who just listened to podcasts.

As for the production results, students' performance was significantly poorer in the productive post-tests after both methods. This finding aligns with previous research,

which has demonstrated that L2 learners tend to have better receptive skills and usually take longer to widen their productive vocabulary knowledge (Laufer, 1998; Nation, 2001; Oxford & Crookall, 1990). It is somewhat surprising, though, that the mean score of the receptive post-tests was higher after the podcast treatments, while that of the productive post-tests was better after the Quizlet treatments. The very slight differences found between the receptive and the productive post-tests following the different treatments do not seem to support previous studies, which have suggested that by producing and contextualizing, that is, by practising the use of the L2 word in a communicative context, students acquire procedural knowledge, are better able to process the language (Swain, 1995) and include less common lexis in their productive knowledge (Laufer, 1998). In light of those results, students should have performed better in the productive post-tests after the podcast treatment. A possible explanation for this incongruence could be found in studies (Hashemi & Pourgharib, 2013; Son, 2001) investigating the effects of visual elements on vocabulary acquisition, which have indicated that using them enables learners to retain and recall the words more easily. Creating and using a Quizlet study set means learning mainly with the aid of visual elements accompanied by some audio, whereas making an audio file does not necessarily involve any visual material. A further explanation may be that, as Oxford and Crookall (1990) suggested, production practice in itself does not ensure vocabulary acquisition, only if the word already exists in the learner's memory. Apparently, both methods helped students to retain the new words in their passive vocabulary knowledge, but they would probably have needed more repetition (Webb, 2007) and production practice to transfer them into their active knowledge. Laufer (1998), who claimed that the repeated use of target vocabulary facilitates its transitions from passive to active knowledge, also supports this idea.

Regarding the third research question about learners' preferences, results indicated that students perceived the Quizlet method as much more effective and attractive than podcasting, which was discarded for future use. This finding was quite unexpected because all previous research had pointed out that students showed a positive attitude towards podcasting (Gholami & Mohammadi, 2015; Philips, 2017). Although the results of the post-tests did not indicate any relevant difference between the two methods, students perceived Quizlet as a much more helpful and useful tool for vocabulary learning than podcasting. The participant's impressions about Quizlet are in line with previous research. Sixty-nine per cent agreed that Quizlet helped them to learn

new vocabulary, which supports Chien's (2015) findings, which also reported that students consider online vocabulary websites, especially Quizlet, a helpful method for vocabulary acquisition. Participants in his study also felt that Quizlet improved their written and oral language skills, as this paper reports. Seventy-five per cent of the students in this study believed they were able to use the new vocabulary in speaking, while 100% stated they could recall and reproduce the new words in writing.

On the other hand, only half of the students considered podcasting a useful technique for vocabulary acquisition, 38% felt that they could use the words learnt by this method in oral interaction, while 69% believed they were able to use them in writing. These positive response rates are lower than the ones reported by Philips (2015).

It is also interesting to note that while 69% of the students in the present study expressed their intention to continue using Quizlet for vocabulary acquisition in the future, in the case of podcasting, the number of positive responses to this question was only 6%. This outcome is contrary to that of Gholami and Mohammadi (2015), who observed positive attitudes in students towards the use of podcasts as a pedagogical tool. Students' negative attitude could be attributed to podcasting being considered as too time-consuming and to students showing negative feelings towards listening to their own voices on a recording. Both of those factors had already been reported in previous research (Philips, 2015).

On the other hand, Quizlet was reported to be easy to use, accessible, more "visual", "fun", and "interactive". This finding broadly supports previous studies (Anjaniputra & Salsabila, 2018; Stroud, 2014) and, furthermore, might explain why participants in our study favoured Quizlet over podcasting despite the fact that retention rates did not show any significant difference between the two methods. The majority of the students had the impression that more learning was taking place when they used Quizlet. This result might be due to the fact that Quizlet does not only allow students to create and modify their vocabulary sets, but also offers various options for self-study and, contrary to podcasts, provides feedback on performance. Students' positive attitude towards this method that provides the possibility to learn anywhere and anytime seems to be consistent with previous studies (Dashtestani, 2015). Quizlet does not make students feel "exposed" nor embarrassed as podcast might do when they choose to listen to it or share it with other students. It is reportedly much easier to work with and provides visual material for learning, while podcast is only audio. Furthermore, when

talking about Quizlet, students recognised the possibility of collaborating with other students in the creation of flashcard sets, which is in line with Burston's (2014) view, which describes technology as a means to support and create collaborative and learner-centered learning environments.

Nonetheless, this study is not exempt from limitations which need to be taken into consideration as they could affect the generalisability of the results. First, the number of students who did all the pre- and post-tests and underwent both treatments was very low. As this research was carried out in a center of non-compulsory education, the number of students attending the classes was subject to considerable fluctuation. The data collection procedure stretched over the course of three weeks, and it was very difficult if not impossible to ensure that the same students attended each class in which a part of the research was carried out. This hindered the collection of quality data and complicated its comparison. Furthermore, due to the lack of time, delayed post-tests were not conducted, so long-term retention of the target vocabulary was not checked. Two further limitations which should be mentioned are the lack of a control group and the broad age range of the students. Both limitations are due to the context where this research was carried out, as the population who attends those schools is quite varied in age, and the number of C1 groups small. Nevertheless, both factors increase the ecological validity of this research as it was carried out in a real classroom with the true limitations of the setting and, thus, it represents the reality of learning vocabulary in schools of languages.

Considering the above-mentioned limitations, further research could be done with a greater number of participants ensuring their participation in the entire procedure. It would also be compelling to carry out a similar study among secondary school students to see if their attitude towards new technologies, especially podcasting, is similar to that of adults. Moreover, further research should include new sets of vocabulary and delayed post-tests, which would provide valuable information on how the two methods affect long-term vocabulary retention.

## **7. Conclusion and pedagogical implications**

Due to the fact that recent times have brought about a technological revolution in every aspect of our lives, technology should be incorporated into language teaching, including adult education, thus enabling students to use a wider variety of tools that aid



language acquisition while promoting autonomous learning. This study set out to compare the effects of creating Quizlet flashcards and podcasts to learn vocabulary and confirmed that both tools enhance receptive vocabulary knowledge, while their value is limited for productive vocabulary acquisition. As the results discussed above did not indicate any considerable difference between the two methods regarding their effectiveness, the decisive factor that should be taken into consideration when choosing a method is students' attitude towards the two techniques. It is a well-known fact that students' motivation plays an important role in learning (Masgoret & Gardner, 2003) and participants in this study demonstrated a clear preference towards studying vocabulary with Quizlet.

The setting of our study is mainly attended by adult students who lead a busy life and need an easily accessible and user-friendly tool that allows them to practice new vocabulary items no matter where they are and how little spare time they have. Participants in this study seemed to favour a learning tool that is interactive, contains visual elements and offers various options for self-study. Quizlet also appears to foster cooperation among learners, since many of them expressed their intention to collaborate with other students in the creation of different study sets with the vocabulary covered throughout the course.

Our participants in general did not like the idea of creating an audio file that contains their own voice and uploading it on the internet or sharing it with other students. They seemed to feel apprehensive about their mistakes and accent, and found the whole process of creating a podcast file time-consuming and inconvenient. Henceforth, based on these results, this paper intends to encourage EFL teachers working in adult education to use Quizlet with their students in class or recommend it to them as a useful and engaging tool for vocabulary acquisition and individual practice outside the classroom setting.

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## **APPENDICES**

### **APPENDIX 1. VOCABULARY TESTS**

#### **1. Pre-test Work Vocabulary Set**

*Translate into Spanish or define the following words and expressions:*

1. to be on the dole:
2. to be snowed under:
3. to be stuck in a rut:
4. to carve a niche for yourself:
5. a dead-end job:
6. donkeywork:
7. to get the axe:
8. to give or hand in your notice:
9. golden handshake:
10. to knuckle down:
11. to lay somebody off:
12. to learn the ropes:
13. to move up the ladder:
14. one of the perks of a job:

## 2. Post-test Work Vocabulary Set

### PART 1.

Match the following words and expressions with their definition.

1. to be on the dole
2. to be snowed under
3. to be stuck in a rut
4. to carve a niche for yourself
5. a dead-end job
6. donkeywork
7. to get the axe
8. to give or hand in your notice
9. golden handshake
10. to knuckle down
11. to lay somebody off
12. to learn the ropes
13. to move up the ladder
14. one of the perks of a job

a) a job with no promotional opportunities

b) an extra benefit you get from a job - something that you get legally from your work in addition to your wages, such as goods, meals, or a car

c) a usually large payment made to people when they leave their job, either when their employer has asked them to leave or when they are leaving at the end of their working life, as a reward for very long or good service in their job

d) living or working in a situation that never changes so that you feel bored

e) getting higher and higher positions

f) the hard, boring part of a job

g) to be unemployed and receive money from the government

h) to have too much work to do

i) to learn how to do a certain job or activity

j) to lose your job

k) to make a special/suitable position for yourself by doing something better than the others

l) to tell your employer that you intend to leave your job after a particular period of time

m) to start to work very hard

n) to stop employing someone, usually because there is no work for them to do

**PART 2. Write a text about how these quotes reflect the role of science and technology in our lives. Use the expressions related to work.**

“Motivating employees to work at their full potential is the main premise of successful management.”

*Eraldo Banovac, Croatian author and professor*

<https://www.snacknation.com/blog/employee-recognition-quotes/>

People may take a job for more money, but they often leave it for more recognition.

*Bob Nelson*

[https://www.brainyquote.com/quotes/bob\\_nelson\\_194819](https://www.brainyquote.com/quotes/bob_nelson_194819)

“A lot of fellows nowadays have a BA, MD or PhD. Unfortunately, they don’t have a JOB.”

*Fats Domino*

<http://filmdope.com/forums/115399-quotes.html>

### **3. Pre-test Sciences and Technology Vocabulary Set**

**Translate into Spanish or define the following words and expressions:**

1. breakthrough:
2. computer buff:
3. computer-illiterate:
4. cutting-edge:
5. digital immigrant:
6. digital native:
7. to excel at something:
8. gadget:
9. grey surfer:
10. to outperform:
11. pathbreaking:
12. to pour money down the drain:
13. to shrink their rank:
14. state-of-art:



## 4. Post-test Science and Technology Vocabulary Set

### PART 1.

Match the following words and expressions with their definition.

1. breakthrough

a) an expert computer user

2. computer buff

b) an important new discovery

3. computer-illiterate

c) an older person who possibly grew up without computers but has embraced the new technology and now happily surfs the internet.

4. cutting-edge

d) a person who was born or brought up during the age of digital technology and who is familiar with computers and the internet from an early age.

5. digital immigrant

e) a small piece of equipment or electronic device

6. digital native

f) anybody who grew up prior to the digital age

7. to excel at something

g) somebody who doesn't know how to use a computer

8. gadget

9. grey/silver surfer

h) the newest, most modern stage in the development of sth

10. to outperform

i) to do better than others

11. pathbreaking

j) to do something very well, or much better than most people

12. to pour money down the drain

k) very original, groundbreaking, pioneering, innovative

13. to shrink their rank

l) to reduce their importance

14. state-of-the-art

m) to waste money

n) using the most modern and recently developed methods, materials, or knowledge

**PART 2. Write a text about how these quotes reflect the role of science and technology in our lives. Use the expressions related to science and technology.**

“Science and technology revolutionize our lives but memory and tradition frame our response.”

Arthur M. Schlesinger

[https://www.brainyquote.com/quotes/arthur\\_m\\_schlesinger\\_109503](https://www.brainyquote.com/quotes/arthur_m_schlesinger_109503)

“I do not fear computers. I fear the lack of them.”

Isaac Asimov

[https://www.brainyquote.com/quotes/isaac\\_asimov\\_100104](https://www.brainyquote.com/quotes/isaac_asimov_100104)

“Automation is great for profits but it’s a real potential trouble area for society.”

Chieh Huang

[https://www.brainyquote.com/quotes/chieh\\_huang\\_891485](https://www.brainyquote.com/quotes/chieh_huang_891485)

## APPENDIX 2. STATISTICAL DATA

### Mann-Whitney Independent Samples

	PreQuiz	PostQuizRE	PostQuizPRO	PODPRE	PodPostRE	PodPostPro
U de Mann-Whitney	11.000	15.500	14.500	13.500	5.000	8.500
W de Wilcoxon	39.000	43.500	29.500	34.500	26.000	29.500
Z	-1.084	-.428	-.491	-.278	-2.115	-1.192
Sig. asintótica(bilateral)	.278	.669	.624	.781	.034	.233

### Wilcoxon Signed-Rank Related Samples (Group 1)

	PostQuizRE - PreQuiz	PostQuizPRO - PreQuiz	PodPostRE - PODPRE	PodPostPro - PODPRE
Z	-2.371 <sup>b</sup>	-1.880 <sup>b</sup>	-2.214 <sup>b</sup>	-.271 <sup>c</sup>
Sig. asintótica(bilateral)	.018	.060	.027	.786

### Wilcoxon Signed-Rank Related Samples (Group 2)

	PostQuizRE - PreQuiz	PostQuizPRO - PreQuiz	PodPostRE - PODPRE	PodPostPro - PODPRE
Z	-2.023 <sup>b</sup>	-.406 <sup>c</sup>	-2.032 <sup>b</sup>	-.948 <sup>b</sup>
Sig. asintótica(bilateral)	.043	.684	.042	.343

**Mann-Whitney Independent Samples for vocabulary set**

	PostVocabWork	PostVocabScience
U de Mann-Whitney	12.500	8.500
W de Wilcoxon	40.500	29.500
Z	-1.248	-1.298
Sig. asintótica(bilateral)	.212	.194